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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/814,588 | 04/01/2004 | Satoru Hosono | Q80867 | 5865 |
| 23373 | 7590 | 02/09/2006 | EXAMINER | |
| SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037 | | | UHLENHAKE, JASON S | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2853 | |

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/814,588

Applicant(s)

HOSONO, SATORU

Examiner

Jason Uhlenhake

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 08/17/2004.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 3, and 9 are rejected under 35 U.S.C. 103(a) as being obvious over Chang (U.S. Pat. 6,619,777) in view of Kusunoki (U.S. Pub. 2004/0017413).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Chang discloses:

- ***regarding claim 1***, a liquid ejection apparatus comprising: a liquid ejection head comprising: a nozzle orifice communicated with a pressure chamber and a pressure generating element which generates pressure fluctuation in liquid which is contained in the pressure chamber (Column 2, Lines 40 – 63)
- ***regarding claim 1***, a drive signal generator, which generates a drive signal containing within one cycle (Column 2, Lines 40 – 63)
- ***regarding claim 1 and claim 9***, first drive subsignal containing a plurality of first drive pulses each of which drives the pressure generating element to generate the pressure fluctuation so as to eject the liquid from the nozzle orifice (Column 2, Lines 45 – 47), and a second drive pulse which drives the pressure generating element to generate the pressure fluctuation so as not to eject the liquid from the nozzle orifice (Abstract, Column 2, Lines 32 – 40, 48 - 63; Column 3, Lines 25 - 30)
- ***regarding claim 1 and claim 9***, at least one second drive subsignal, containing only the first drive pulses (Figure 6, Column 12, Lines 35 – 65)
- ***regarding claim 1 and claim 9***, pulse supplier, which selectively supplies at least one of the first drive pulses and the second drive pulse to the pressure generating element in accordance with an amount of the liquid to be ejected from the nozzle orifice (Column 2, Lines 48 – 63; Column 10, Lines 7 – 30)
- ***regarding claim 2***, wherein all of the first drive pulses have an identical waveform (Figure 6, Column 10, Lines 30 – 45; Column 11, Lines 24 – 29)

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- **regarding claim 3**, the second drive subsignal is arranged at the beginning of the one cycle of the drive signal (TS1 of Figure 6)
- **further regarding claim 9**, method of controlling a liquid ejection apparatus comprising: a liquid ejection head provided with: a nozzle orifice communicated with a pressure chamber and a pressure generating element which generates pressure fluctuation in liquid which is contained in the pressure chamber (Column 2, Lines 40 – 63)

Chang does not expressly disclose:

- **regarding claim 1 and claim 9**, wherein each of the first drive subsignal and the second drive subsignal is associated with a minimum area subjected to the liquid ejection

Kusunoki discloses:

- **regarding claim 1 and claim 9**, wherein each of the first drive subsignal and the second drive subsignal is associated with a minimum area subjected to the liquid ejection (Claim 4, Claim 6)

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teachings of each of the first drive subsignal and the second drive subsignal is associated with a minimum area subjected to the liquid ejection as taught by Kusunoki into the device of Chang. The motivation for doing so would have been to control ink ejection volume while reducing fluctuation of an ink ejection velocity to the minimum.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (U.S. Pat. 6,619,777) as modified by Kusunoki (U.S. Pub. 2004/0017413) as applied to claim 1 above, and further in view of Takahashi et al (U.S. Pub. 2004/0056909) and Sekiguchi (U.S. Pub. 2004/0090476).

Chang as modified by Kusunoki discloses all of the claimed limitations except for the following:

- ***regarding claim 4***, each of the first drive pulses and the second pulse is designated by one of pulse selection data processed in the pulse supplier; and the number of the pulse selection data for the first drive subsignal and the number of the pulse selection data for the second drive subsignal are the same
- a predetermined potential of the second drive subsignal is supplied to the pressure generating element by one of the pulse selection data for the second drive subsignal

Takahashi et al discloses:

- ***regarding claim 4***, each of the first drive pulses and the second pulse is designated by one of pulse selection data processed in the pulse supplier; and the number of the pulse selection data for the first drive subsignal and the number of the pulse selection data for the second drive subsignal are the same (Paragraphs 0012, 0028, 0030), for the purpose of improving printing speed.

Sekiguchi discloses:

- ***regarding claim 4***, a predetermined potential of the second drive subsignal is supplied to the pressure generating element by one of the pulse selection

data for the second drive subsignal (Paragraph 0032), for the purpose of stably ejecting droplets from the apparatus.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of first drive pulses and the second pulse is designated by one of pulse selection data processed in the pulse supplier; and the number of the pulse selection data for the first drive subsignal and the number of the pulse selection data for the second drive subsignal are the same; a predetermined potential of the second drive subsignal is supplied to the pressure generating element by one of the pulse selection data for the second drive subsignal as taught by Takahashi and Sekiguchi into the device of Chang as modified by Kusunoki. The motivation for doing so would have been to improve printing speed and stably eject droplets from the apparatus.

Claim 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (U.S. Pat. 6,619,777) as modified by Kusunoki (U.S. Pub. 2004/0017413) as applied to claim 1 above, and further in view of Kobayashi (U.S. Pat. 6,679,586).

Chang as modified by Kusunoki discloses:

- ***regarding claim 5***, duration of the one cycle (T1, T2, T3, T4) of the drive signal is less than an interval (T) of the first timing signals (Figure 6)
- ***regarding claim 6***, duration of each of the first drive subsignal and the second drive subsignal is less than an interval (T) of the second timing signals (Figure 6)

- minimum areas is repetitively defined in accordance with a series of second timing signals which are generated in the external of the drive signal generator (Claim 4 and Claim 6)

Chang as modified by Kusunoki does not expressly disclose:

- ***regarding claim 5***, drive signal is repetitively generated in accordance with a series of first timing signals which are generated in the external of the drive signal generator

Kobayashi et al discloses:

- ***regarding claim 5***, drive signal is repetitively generated in accordance with a series of first timing signals which are generated in the external of the drive signal generator (Column 2, Lines 33 – 46; Claim 1), for the purpose of maintaining proper ink ejection without stopping printing operation.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of drive signal is repetitively generated in accordance with a series of first timing signals which are generated in the external of the drive signal generator as taught by Kobayashi et al into the device of Chang as modified by Kusunoki. The motivation for doing so would have been to maintain proper ink ejection without stopping printing operation.

Claim 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (U.S. Pat. 6,619,777) as modified by Kusunoki (U.S. Pub. 2004/0017413) as applied to claim 1 above, and further in view of Hosono (U.S. Pat. 6,984, 010).

Chang as modified by Kusunoki discloses all of the claimed limitations except for the following:

- ***regarding claim 7***, the first drive pulses include a pair of first ejection pulses each for ejecting a liquid droplet having a first volume, and a second ejection pulse generated between the first ejection pulses for ejecting a liquid droplet having a second volume less than the first volume.

- ***regarding claim 8***, the first drive pulses are generated at a fixed interval each for ejecting a liquid droplet having a fixed volume

Hosono discloses:

- ***regarding claim 7***, the first drive pulses include a pair of first ejection pulses each for ejecting a liquid droplet having a first volume, and a second ejection pulse generated between the first ejection pulses for ejecting a liquid droplet having a second volume less than the first volume (Column 5, Lines 30 – 35), for the purpose of optimizing the ejection characteristics of the ink droplets.

- ***regarding claim 8***, the first drive pulses are generated at a fixed interval each for ejecting a liquid droplet having a fixed volume (Column 3, Lines 31 – 36), for the purpose of optimizing the ejection characteristics of the ink droplets.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of the first drive pulses include a pair of first ejection pulses each for ejecting a liquid droplet having a first volume, and a second ejection pulse generated between the first ejection pulses for ejecting a liquid droplet having a second volume less than the first volume; the first drive pulses are

generated at a fixed interval each for ejecting a liquid droplet having a fixed volume as taught by Hosono into the device of Chang as modified by Kusunoki. The motivation for doing so would have been to optimize the ejection characteristics of the ink droplets.

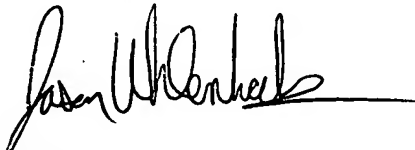
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Uhlenhake whose telephone number is (571) 272-5916. The examiner can normally be reached on Monday - Friday 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JSU
January 25, 2006



 4/06
K. FEIGINS
PRIMARY EXAMINER